Computational Modeling of War and Peace

By Ray Dacey and Robert Muncaster

Editor's Note: The following article describes a fairly ambitious multi-disciplinary research project being undertaken by professors at Idaho and the University of Illinois. It is supported, in part, by the Martin Institute. For further information contact Dr. Ray Dacey, UI College of Business and Economics, rdacey@uidaho.edu.

This is a brief report on a research project related to the Martin Institute. The project involves a seven member research team, with five members at the University of Idaho and two at the University of Illinois. The project focuses on the evolution of societal institutions. The project seeks to determine the conditions under which societies undergo rebellion and revolution, on the one hand, and engage in inter-state war, on the other.

The research team is composed of Lisa Carlson (Political Science), Michael O'Rourke (Philosophy), James Foster and Scott Harrison (Computer Science), and Ray Dacey (Business) at the University of Idaho, and Dina Zinnes (Political Science) and Robert Muncaster (Mathematics and Political Science) at the University of Illinois. Lisa and Ray have long been affiliated with the Martin Institute. Michael is fairly new to the University of Idaho and works in Philosophy of Science and Logic. He has played a major role in developing the Critical Thinking program department and the Inland Northwest Philosophy Conference. James has been instrumental in developing the Laboratory for Applied Logic in the Computer Science Department, and is currently on sabbatical leave doing serious hands-on research in a laboratory in the Biology Department. Scott is just beginning his first year at the university. He brings to the team a broad and modern set of computer skills. Dina Zinnes is a Distinguished Associate of the Martin Institute and the Director of the Merriam Laboratory for Analytic Political Research. Bob Muncaster is in Applied Mathematics and, through his long association with Dina, has made major contributions to the formal study of political and international processes. Simply put, this is an unusual team.

This multidisciplinary group will develop and implement a computer-based simulator that allows an analysis of adaptations in complex social systems. As such, it is a research project in the wider realm of what has become known as the study of Complex Adaptive Systems. This area has seen very rapid growth over the last decade and has produced some very sophisticated simulators and research projects. Most of these have involved either economic or biological systems. Our project spans these two groups and uses biological metaphors to model complex political-economic interactions. (The primary web site for Agent-Based Computational Economics is available at <http://www.econ.iastate.edu/tesarfsi/ace.htm>; the web site for the Evolutionary Dynamics program at the Santa Fe Institute is available at <http://www.santafe.edu/sfi/publications/Bulletins/bulletin-winter99/evolution.html>.)

The thrust of our research project is the co-evolution of learning and societal institutions. The team will examine learning at three levels — the individual decision maker level, the social group level, and the nation-state level — to determine how learning and the evolution of societal institutions and organizations influence each other. Simulation software will provide the medium for examining the various facets of this co-evolution. This medium will then be used as a computational

(cont. on pg. 3)
DIRECTOR'S CORNER

Communication and transportation costs have declined precipitously during the last century, most notably in the last fifty years owing to rapidly advancing technology. Emerging multinational institutions and instant communication have enabled the creation of a global financial market, while wireless telecommunication technologies have eliminated national borders as barriers to the flow of political information. These changes have profound implications for the peaceful resolution of conflict.

A casual observer at the end of twentieth century would find politics in the Balkans to be not unlike they were at its beginning. A closer look would reveal that the colonial empires that dominated the world in 1900 have collapsed. The only new twentieth century empire, the Soviet Union, also collapsed from the impossibility of centrally directing millions of people in competition with free markets. Democracy, still experimental and largely unknown in 1900, is today the dominant form of political organization while autocracy continues to disappear. It is no coincidence that the spread of democracy correlates inversely with the ability of governments to control information. The October coup d'état in Pakistan was perhaps most notable for the rarity of such events in today's world as opposed to even thirty years ago.

Reduction of economic barriers has similarly affected the role of physical territory in the calculation of national power: there is little need to seize territory if one can simply purchase resources, with that ownership supported by the requisite global legal and financial institutions. In 1950 the European Coal and Steel Community, precursor to today's European Union, was formed to provide joint control of territory that had been instrumental in three wars over seventy years. The technological and institutional imperative today, however, supports decentralization, ironically undermining the basic political thesis of the EU just as it realizes its greatest economic success.

Today's world is increasingly an interlocking set of states, non-state actors, and multilateral organizations largely created in the aftermath of World War II. This is not world government, but its decentralized flip side: a growing network of global actors, each of which is free to pursue its own interests within the common framework. On the IGO side, the network includes the United Nations and regional organizations such as NATO that provide a nexus for military and political decisions, and the IMF, World Bank, and World Trade Organization, which provide a nexus for financial and economic decisions.

Such an arrangement still requires ongoing leadership from the leading state members of the system, primarily the United States, which can deny this responsibility only at its own peril.

Communications do not yet, and likely never will, flow so smoothly that decisions can be made and conflict resolved through instant, simultaneous negotiation among all parties. Nor will there ever be world government, nor will developing international bureaucracies ever fully undertake the political responsibilities of sovereign states. There will, however, be a set of legal, financial, and other institutions capable of enabling the world to function with ever-less (never-zero) violence and need for overbearing government.

In this transition from what was to what will be, the world is now faced with the debris of seventy years of unresolved conflict left by the collapse of the Soviet Union. The new states of the former Soviet Union, the failed states of Africa, and some developing countries elsewhere do not yet possess the financial and legal institutions necessary for non-politicized conflict resolution. Cultural differences loom large in these conflicts, perhaps not so much because they are irreconcilable as because of the intersection of twentieth century nationalism and armaments with centuries-old political, social, and economic institutions.

In 1900, or even 1940, such conflict would have been simply submerged under the heel of the current occupying army. Today, the international community, with significant American participation, is writing new law and learning how to address conflict in ways that promise more than temporary solutions. It is also perhaps learning that true solutions lie in legal, political, and financial structure, and not in humanitarian quick fixes. From Somalia to Burundi to Bosnia, Kosovo, and East
Timor, the international community’s response is coming sooner and in more definitive ways.

Mistakes will be made, but there is hope in this record. It has, after all, been only ten years since the collapse of the last great empire. The twenty-first century may indeed be more peaceful than the twentieth.

Richard AS

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research tool for examining specific questions regarding the causes of war and the conditions for peace. In particular, the project will pursue three specific research objectives:

1. To uncover how methods of inference and action employed by boundedly rational individuals determine the evolutionary paths of societal institutions and organizations.

2. To develop new and more powerful systems of computer modeling for societal evolution.

3. To examine the type of social collectives which evolve given different learning algorithms.

We presented an initial piece of the project at the October 1999 meeting of the Peace Science Society. Muncaster developed a simulator to run models of a world wherein nations group together on the basis of the age-old maxim that “the friend of my friend is my friend; the friend of my enemy is my enemy, the enemy of my friend is my enemy; and the enemy of my enemy is my friend.” In earlier work, Muncaster and Zinnes, and their colleagues at the Merriam Laboratory, worked out the evolutionary mathematics of this system. Simply put, the system converges to a bipolar world similar to that of the Cold War era. The simulator allows the analyst to examine the details of the paths that lead to the bipolar world.

The primary focus of analyses of complex adaptive systems is to uncover the means whereby fairly complex institutional structures arise from various kinds of fairly simple lower-level components. The “friend of my friend” project showed that a fairly complex organizational structure, i.e., a bipolar arrangement of nations, arises from a fairly simple system of constituents, i.e., nations guided by the “friend of my friend” maxim. The Peace Science Society paper describes a simulator that reveals the paths to the bipolar world. In ensuing work we will attempt to further develop this simulator into a computer-based system that supports examinations of the rise of complex institutional structures from various kinds of lower-level constituents.
MI INVOLVED IN KOSOVO DISCUSSIONS

The Kosovo crisis became an important topic of discussion during April 1999. The Martin Institute provided an informational link with the students and community by hosting two public debates on the crisis and participating in University of Idaho television and Idaho Public Broadcasting programs that specifically dealt with Kosovo.

On April 6th and April 20th of this year, the Martin Institute organized and sponsored two public forums dealing with what was happening in Kosovo. The first, held in the University of Idaho College of Law Courtroom, attracted over 350 students and community members from Idaho and WSU. This program, which featured Dr. Richard Spence, Department Head for History, Dr. Lisa Carlson, Associate Professor of Political Science, and Dr. Rand Lewis, Associate Director of the Martin Institute, developed the background on the Balkan region and NATO. The second discussion, held in the University of Idaho Student Union Ballroom, involved a larger panel, and included Dr. Carlson and Dr. Lewis from the first meeting and Dr. Andrew Appleton, Associate Professor of Political Science at WSU, and Colonel Chet Herbst, Professor of Aerospace Science for Idaho and WSU. In this discussion, each of the options available to the primary players (NATO, Western Europe, U.S., Russia, and Serbia) was developed. Once again, over 350 people attended, with many asking excellent questions of the panel members.

In May, Dr. Lewis was asked to participate in a University of Idaho television interview covering the Kosovo topic. He then participated in the Idaho Public Broadcasting "Dialogue" program, which was broadcast across the state and allowed call-in questions. These were excellent opportunities for developing statewide visibility for the Martin Institute.

The success of this effort on the Kosovo issue provided a widening spectrum of opportunities associated with the Institute’s goal of information and education. We are looking forward to continued sponsorship of discussions and speakers that address critical international issues.

GRADUATE COURSE IN CONFLICT MANAGEMENT

The Department of Resource Recreation and Tourism at UI will offer a two-day graduate colloquium on natural resource conflict management on November 5-6, 1999 (Friday afternoon and evening and all day Saturday.) Curtis Bretten, Martin Institute mediation coordinator, is helping Dr. Chuck Harris of the RRT Dept. to plan the course, which is available to all graduate students.

An interdisciplinary team of professors and practitioners will lead discussions on:

• What is conflict and can it be managed;
• Approaches and techniques of conflict management;
• Case studies and simulations;
• International applications; and
• Research findings in conflict management.

The course registration number (CRN) is 19603, and students can obtain further detail about the course from Dr. Chuck Harris at (208) 885-6314, or by e-mail to charris@uidaho.edu.
ACKNOWLEDGEMENT OF DONORS

We would like to acknowledge and thank the many individuals who have made donations to the Martin Institute for Peace Studies & Conflict Resolution during the past year. Without their continuing support, the many activities mentioned in the issues of this newsletter would not be possible. Gifts acknowledged below are those received during the period July 1, 1998 and June 30, 1999.
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The Institute also wishes to thank the Ford Motor Company, which has supported the Martin Institute by matching the gifts of its employees.

NEW FORUM SERIES

The Martin Institute is pleased to announce creation of the Martin Forum. The Martin Forum is an ongoing multi-disciplinary lecture and discussion series, focused on international topics. All faculty at the University of Idaho, Washington State University, and Lewis and Clark State College have been invited to participate in the forums, which are also open to individuals in the surrounding communities.

Expected topics for discussion include ad hoc public events such as the Kosovo forums held in the Spring of 1999 and the State Department Town Meeting in October 1998, and relevant research presentations and reviews of current research literature. Many of these sessions may be led by Associates of the Martin Institute, faculty at one of the three schools, or notable speakers who are available through a variety of channels.

Forums will be held in Moscow, Pullman, and Lewiston, and will be scheduled as speakers become available or as events occur that warrant a special public session.
The students ... will join approximately 2000 other delegates from 160 universities and colleges from seven countries around the world.

MARTIN INSTITUTE SPONSORS MODEL UNITED NATIONS

The Model United Nations (MUN) program was re-instituted at the University of Idaho this past summer after a hiatus of over 20 years. Dr. Rand Lewis, Associate Director of the Martin Institute, has taken the responsibility of faculty adviser for this outstanding program both at the University of Idaho and Washington State University. The Martin Institute sponsors the International Affairs Club, which supports the Model U.N. delegation from the two universities, will help develop a high school Model U.N. program for Idaho and Eastern Washington, and will provide logistical support for the MUN activities throughout the year.

The MUN program is an exciting opportunity for University of Idaho and Washington State University students to gain an exposure to international structures and the art of diplomacy. Students who hope to be selected as delegates to the MUN conference in New York each spring semester, will take the International Studies (IS) 200/400 course to prepare themselves to best represent UI and WSU. Those taking the course will discover the richness of the world of international relations. They will heighten their appreciation of the complexities of international politics on a wide range of issues. Inherent in the experience, the delegates will come to know both the frustrations of multilateral diplomacy and the thrill of accomplishment in successfully arguing a foreign policy position.

IS 200/400 is team taught by Dr. Rand Lewis, Rolf Mann, Adjunct Instructor of History, and Michael Fiedler, Ph.D. Candidate in Political Science. Each of these instructors was intimately involved in U.N. issues in the past and have experience and knowledge that will help the delegation prepare for the conference. The students will get detailed preparation that will insure success in New York, where they will join approximately 2000 other delegates from 160 universities and colleges from seven countries around the world. They will learn how nations interact in the international arena and how the United Nations and other international organizations are structured and work towards resolution of issues.

In November, the MUN class will find out which country they will represent in New York. At this time, the students will begin to conduct comprehensive research on their nation, which includes the primary international issues that are of importance to that country and its voting record patterns at the General Assembly, Security Council, and other supporting organizations, such as NATO, World Bank, and IMF. The next four months will be devoted to developing the most extensive research data bank possible on the designated country and their interactions with the international community. In late November, the delegation and alternates are selected to represent our universities. We are projecting a first year team of 8 delegates and 4 alternates. The eight delegates will spend the rest of the pre-conference period developing their individual committee positions, supported by the balance of the class. The students who do not go to New York will then use their knowledge to begin organizing and running a high school MUN program that will be held at the University of Idaho in the spring of 2001 and will be sponsored by the Martin Institute and the International Affairs Club.

The MUN is another example of what the Martin Institute is doing to support the University of Idaho students and to develop a cooperative atmosphere between Idaho and WSU. This is an exciting program that provides our students with real life skills, which will be invaluable in their futures following graduation. They will build confidence in their ability to speak to groups effectively, to write clearly and concisely, and hone their interpersonal skills. Each student will find that the opportunities for networking will be excellent ways of developing longer-term relationships for post-graduation.
AIR FORCE ACCREDITS IS PROGRAM

The Air Force has instituted a new opportunity for their officer corps, called the Foreign Area Officer program, which develops, retains, and monitors officers possessing foreign language skills and regional area studies. Inherent in this new program is the opportunity for high school students interested in international affairs to attend a university, on full scholarship, for an accredited international studies degree.

The Martin Institute, responsible for coordinating and administering the International Studies program at the University of Idaho, applied for accreditation this past spring. In early August, we were informed that our program was approved for obtaining a B.A. degree with emphasis in Latin America, Western Europe, or the Far East. This means that students who accept Air Force scholarships designated for non-technical programs (approximately 25% of the scholarships available each year) will find the UI listed as an approved program through the Air Force Institute of Technology. Students who would not normally consider Idaho will find that our program in International Studies meets the stringent requirements of the Air Force for their scholarship cadets. As our program evolves and gains greater credibility in the region, the potential for these students to select Idaho will increase. We look forward to a long-term relationship with the U.S. Air Force and the opportunity to provide a strong international studies background to their future Foreign Area Officers.

CONFLICT RESOLUTION WORKSHOP FOR EDUCATORS

...administrators were introduced to the mutual gains negotiation process...

In February, the Martin Institute conducted a one day workshop for elementary and secondary school administrators in the five northern counties of Idaho. Assisting Curtis Brettin were Dr. Kathy Canfield-Davis of the Idaho Water Resources Research Institute and Mr. Rick Mallory of J-U-B Engineers, Inc. During the workshop, administrators were introduced to the mutual gains negotiation process, participated in two negotiation simulations, and listened to strategies on how to implement the negotiation process in their daily work. Overall, the workshop was well received and will serve as the point of departure for developing a negotiation curriculum specifically for elementary and secondary educators and administrators.
Coeur d'Alene Project Update

The Martin Institute continues to support the Idaho Water Resources Research Institute with its community-based environmental protection project in the Coeur d'Alene Basin in northern Idaho. The project started in late 1997 and is designed to explore alternative methods of dealing with environmental disputes. Curtis Brettin of the Martin Institute is assisting Kathy Canfield-Davis of IWRRI with management of the project.

The Consensus Building Institute (CBI), of Cambridge, Massachusetts, was selected to perform a conflict assessment for the project, to determine the nature of specific issues with regard to protection of the basin. In June, fifty individuals from organizations and groups having an interest in the Coeur d'Alene Basin were interviewed to determine their views on actual and potential environmental issues.

The first week of September, CBI provided a draft report to all who were interviewed. Of principal interest in the report were these five recommendations:

1. that the University, in conjunction with key stakeholders, host community summits to build understanding, generate options, and develop a shared vision among stakeholders for a sustainable Basin environment and economy.

2. that the state, the federal government, the Coeur d'Alene tribe, and other groups institute a structured partnering process to assist them in building agreement on a comprehensive, politically acceptable, community-supported, clean-up plan that would integrate issues of clean-up, water quality standards, and economic development.

3. that the state, the federal government, the Coeur d'Alene tribe, and others consider the use of facilitation, mediation, and/or consensus building to support the partnering process.

4. that key players clarify the linkages (or lack thereof) between the Natural Resource Damages lawsuit and other related, but additional processes and issues (for instance, the state initiated agreement-building process, application of state water quality standards, and the EPA Superfund expansion).

5. that the University, and/or other players, establish a Coeur d'Alene River Basin Institute for Sustainability to serve as a clearinghouse for technical, scientific, and economic information and to act as a non-partisan organization for bringing together diverse and often competing interests.

The report will be made public on conclusion of the comment period.
INTERNATIONAL AFFAIRS CLUB FORMED

The International Affairs Club, created by the Martin Institute in July 1999, is a new student organization which will give UI students an opportunity to gain international experiences at and beyond the Moscow campus. Club members will support the Model United Nations competition, hold special programs on international issues, and interact with international students at both UI and Washington State University.

Interim student officers have already voluntarily stepped forward to head the club, with the Martin Institute, actively involved in advising the officers, also providing direction for the initial task of attracting students. Personal letters of invitation were sent to all International Studies majors and minors. The student president spearheaded a marketing campaign, which included advertising and participation in events such as the Palousafest (a fall program for new and returning students) and the Student Information Fair, which are major student recruiting activities of the university.

Over the summer the Martin Institute was also involved in creation of an international affairs club at Washington State University. That club will be affiliated with the UI club and the Martin Institute as well.

During the coming year, Martin Institute staff will provide club members with maximum support to gain meaningful extra-curricular experience, select the best activities and obtain resources. Students have already planned a golf tournament, held at the UI golf course on Saturday, October 16, as their first fund-raising activity to help support club activities and travel funds for the UI team to attend the Model United Nations in New York in March.
NORTHWEST INSTITUTE HAS SUCCESSFUL YEAR

May marked the third year for Martin Institute’s involvement in the weeklong Northwest Institute for Conflict Resolution at the UI College of Law. The Institute was well attended with people traveling from throughout Idaho, Washington, and Montana to attend. This year four courses were offered:

- Basic Forty Hour Civil Mediation, taught by Sam Imperati, executive director of the Institute for Conflict Management;
- Basic Forty Hour Family Mediation, taught by Steve K. Erickson, co-founder of the Academy of Family Mediators;
- Logic and Legal Reasoning, taught by Douglas Lind, professor of Philosophy at the university of Idaho; and
- Legal Writing, taught by Ron Hofer, attorney for the Wisconsin Court of Appeals.

More than eighty people attended, the best turnout in three years. Curtis Brettin assisted Professor Maureen Laflin, Director of both the Northwest Institute and the Legal Aid Clinic, with planning and implementing the Institute. In addition to being on hand to manage the event, Maureen and Curtis both served as coaches in the two mediation courses. Evaluations from those participating were very positive, indicating that the program is on the right track. Plans will soon be under way for the spring 2000 institute session.

GROWTH IN FACILITATION ACTIVITY

The Martin Institute has facilitated several meetings in the state recently. In July, Curtis Brettin facilitated an all-day strategic planning meeting for the Moscow Chamber of Commerce. He assisted the executive council in working through their goals and objectives for the next year. The meeting was a good opportunity for local business leaders to learn about the Martin Institute.

In late July, Curtis Brettin and Martin Institute Director Richard Slaughter facilitated a meeting in Twin Falls at the College of Southern Idaho (CSI). The meeting was convened by Roy Mink, Director of Idaho Water Resources Resource Institute (IWRRI) and was attended by community leaders from Twin Falls and Jerome. The principal issues under discussion were water quality for the City of Twin Falls and development of land north of the Snake River, towards Jerome.

Over forty people attended the meeting. Richard and Curtis met with selected stakeholders prior to the facilitation to get a sense of the issues that were being addressed. The meeting yielded a commitment from the Twin Falls Chamber of Commerce to continue the conversation started at the meeting.

In late August, Curtis co-facilitated a meeting in Wallace, Idaho with Dr. Kathy Canfield-Davis of IWRRI. Kathy and Curtis managed an education forum for local elected officials on environmental issues in the upper Coeur d’Alene Basin. EPA and the Idaho Department of Environmental Quality (DEQ) sponsored the meeting. Steve Allred, Director for DEQ, and Chuck Clarke, Regional Director for EPA, were on hand in the afternoon to update the participants on activity in the basin.
When a search for mutual gains negotiation materials oriented toward educators yielded little material, it was decided that such materials would have to be created.

**PUBLIC SCHOOL CONFLICT RESOLUTION PROJECT**

The Martin Institute initiated a cooperative venture with Idaho Water Resources Research Institute (IWRRI) to develop a conflict resolution curriculum for elementary and secondary schools in Idaho. Project staff were Dr. Kathy Canfield-Davis (IWRRI) and Curtis Brettin (Martin Institute).

The need to develop a curriculum targeted toward educators became apparent from feedback gained at a February training session for school administrators conducted in Post Falls, ID by the Martin Institute. Educators attending the session indicated they could not relate well to negotiation materials geared toward environmental and regulatory disputes. When a search for mutual gains negotiation materials oriented toward educators yielded little material, it was decided that such materials would have to be created.

The best avenue for development was to convene a focus group composed of elementary and secondary education teachers and administrators to aid in curriculum design, make the materials relevant to the education context, and assist market. In June, Kathy—a former school superintendent for Post Falls—recruited a focus group comprised of six elementary and secondary teachers and administrators from Northern Idaho.

In July, the group participated in a mock training session to learn the basics of mutual gains and how simulations can be used to introduce and reinforce negotiation techniques. Finally, they provided feedback on which elements they liked and which needed more work – all in a fun, fast-paced session.

Later in the summer the focus group was reconvened for two days to brainstorm a range of likely conflict scenarios, selecting five to turn into simulations. Focus group members developed ideas and specific simulation materials, while Kathy and Curtis produced lecture materials for the focus group to review. The goal is to produce a small collection of simulations, along with a model lecture on mutual gains, that school districts can adapt and use in training their own faculty and staff.
MISSION STATEMENT

The Martin Institute for Peace Studies and Conflict Resolution is a multi-disciplinary center at the University of Idaho, founded in the belief that war and violence are neither necessary nor inevitable. Its purposes are to encourage education and research to advance peace at all levels, and also to resolve local and regional conflicts with alternatives to confrontation and litigation. Institute scholars seek to understand the major causes of disputes and violence and to provide information, training and assistance for the resolution of conflicts. The institute brings together scholars, students and present and future leaders to develop the knowledge needed for the ongoing and new challenges of establishing peace as a basis for long-range social and economic progress.